stress. The blackboard model polygon, with the two end sides long, and four short sides, was rolled over on a lath fixed to the board, while the apex drew five circular arcs. The vertical ordinates gave the square roots of maximum bending moments on a 42-ft. girder due to the transit of a 30-ft. 42-ton locomotive. The short sides of the polygon doubled are the distances apart of its five wheels, while the five spaces into which the span is divided by perpendiculars from the intersecting points of the arcs give, numerically, the loads on the wheels. The cycloid is an extreme case, and an interesting curve modified from it was shown, and a new pair of conjugate load areas that balance the linear circular rib and lead to a geometrical solution of the equilibrium of the semi-circular masonry arch.

PARIS.

Academy of Sciences, November 7.—M. Georges Lemoine in the chair.—C. **Richet**: An optical illusion in the appreciation of velocity.—G. **Charpy** and G. **Decorps**: The determination of the degree of oxidation of coal. An empirical method based on the extraction of the constituents of the coal by 50 per cent. soda solution at 100° C., and measurement by permanganate of the amount of oxygen required for the oxidation of the organic matter.—G. **Julia**: A class of functional equations.—H. **Villat**: Certain integral equations possessing an infinity of solutions with an unlimited number of arbitrary parameters.—K. **Popoff**: The development of an arbitrary function in series according to a suite of given functions.—P. **Boutroux**: The functions associated with an "autogenous" group of substitutions.—M. **Riabouchinski**: The general equations of movement of solid bodies in a perfect incompressible fluid.—M. **Michkovitch**: The rectifications of the ephemerides of the minor planets. —M. **Salet**: Spectrophotometry of stars containing carbon.—A. **Buhl**: The *rôle* of analytical symmetries in the relativist theories.—P. **Langevin**: The theory of relativity and the experiment of M. Sagnac. A proof that the generalised theory of relativity gives a quantitative explanation of Sagnac's experiment.—M. **Décombe**: The theory of the galvanic battery.—M. **Travers**: A new method for the estimation of fluorine at the ordinary temperature. Fluorine is obtained in the state of soluble alkaline fluoride, potassium silicate and a little hydrochloric acid added, and precipitated as potassium fluosilicate by potassium chloride. The precipitate is estimated by titration.—M. **Grandmougin**: The homonuclear dibromoanthraquinones.—E. **Rothé**: The use of radiogoniometry in the study of storms and of atmospheric "parasite" currents. It is possible to predict the weather from the observation of the parasite currents.—J. **Lacoste**: The relation existing between the directions of depressions and the directions of the maxima of the atmospheric parasites.—Mlle. Yvonne **Boisse** and P. **Marty**: The plurality of the eruptive apparatus of the Cantal massif.—R. **Souèges**: The embryogeny of the Boraginaceæ. The last stages of the development of the embryo in *Myosotis hispida*.—St. **Jonesco**: The formation of anthocyanine in the flowers of *Cobaea scandens* at the expense of the pre-existing glucosides. The experiments of E. Rosé, which gave negative results for glucosides in the non-coloured flowers are shown to be incorrect. Glucosides are always present, and the author holds that the colouring matters are produced at the expense of these pre-existing glucosides.—H. **Colin**: The graft of sunflower on the Jerusalem artichoke. Studies on the transformations of the carbohydrates.—A. **Kozlowski**: The formation of the red pigment of *Beta vulgaris* by oxidation of the chromogens. The chromogens extracted from the maritime beet and the white sugar-beet were white or light yellow. On oxidation these gave a red pigment spectroscopically identical with colouring matter from the red beet. The chromogens from the white beets have some properties in common with the saponins; they have a bitter taste, and produce froth and decolorisation of red-blood corpuscles.—P. **Dangeard**, jun.: The formation of aleurone grains in the albumen of the castor-oil plant. The observations described and illustrated lead to the conclusion that the formation of the aleurone grains is only a particular case of a more general phenomenon, the evolution of the vacuolar system.—E. **Chatton**: A new kinetic mechanism: syndinian mitosis in the plasmodial parasitic Peridinians.—M. **Baudouin**: A method for the determination of the minerals constituting prehistoric metallic axes: use of spectrum analysis. The presence or absence of tin is readily determined by the spark spectrum without mutilating the specimen.—F. H. **Quix**: The *rôle* of the otoliths in the spontaneous movements of animals during jumping and falling.—P. **Brodin** and P. **Huchet**: A new anti-anaphylactising substance, formaldehyde-sodium hydrosulphite.—G. **Truffaut** and M. **Bezssonnof**: The variations of energy of *Clostridium Pastorianum* as nitrogen-fixing organisms. The partial sterilisation of the soil by calcium sulphide increases, not only the number of *C. Pastorianum*, but also their capacity for fixing nitrogen.—C. **Levaditi** and S. **Nicolau**: Neurotropic affinity and the purification of the virus of vaccine.

CAPE TOWN.

Royal Society of South Africa, September 28.—Dr. J. D. F. Gilchrist, president, in the chair.—J. **Moir**: Colour and chemical constitution, pt. 15. A systematic study of fluorescein and resorcin-benzine. Colour-factors have been obtained by experiment whereby the colour of any halogenated fluorescein can be calculated. A preliminary investigation of resorcin-benzine derivatives follows.—J. D. F. **Gilchrist**: The origin of paired fins in fishes.

Books Received.

Australasian Antarctic Expedition, 1911–14. Under the Leadership of Sir D. Mawson. Scientific Reports. Series C: Zoology and Botany. Vol. 8, part 1: Echinodermata Asteroidea. By Prof. R. Koehler. Pp. 308+75 plates (Sydney: Government Printing Office.) 38*s*.

Stanford's New Map of the Pacific Ocean. 30 in. ×22½ in. (London: E. Stanford, Ltd.) Coloured sheet, 4*s*.

The Marketing of Whole Milk. By Dr. H. E. Erdman. (The Citizen's Library: Marketing series.) Pp. xvi+333. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd.) 21*s*. net.

The Wisdom of the Beasts. By C. A. Strong. Pp. x+76. (London: Constable and Co., Ltd.) 5*s*. net.

Wisconsin Geological and Natural History Survey. Bulletin No. 55: Soil series, No. 27. Soil Survey of Northern Wisconsin. By A. R. Whitson and others. Pp. iv+46. Bulletin No. 58: Educational series, No. 6. The Geography and Economic Development of South-eastern Wisconsin. By Prof. R. H. Whitbeck. Pp. x+252. (Madison, Wis.)

Air Ministry: Meteorological Office. Geophysical Memoirs, No. 17: Simultaneous Values of Magnetic Declination at Different British Stations. By Dr. C. Chree. Pp. 175–200. 2*s*. net. Geophysical Memoirs, No. 18: Observations of Radiation from the Sky, and

© 1921 Nature Publishing Group

an Attempt to Determine the Atmospheric Constant of Radiation. By W. H. Dines. Pp. 201–212. 1*s.* 3*d.* net. (London: H.M. Stationery Office.)

Agricultural Directorate: Ministry of Interior, Mesopotamia. Memoir III: Dates and Date Cultivation of the 'Iraq. By V. H. W. Dowson. Part 1: The Cultivation of the Date Palm on the Shat Al 'Arab. Pp. viii+75. 10*s.* net. Part 2: The Results of an Investigation into the Yield of Date Palms on the Shat Al 'Arab. Pp. vi+26+tables. 5*s.* net. (Cambridge: W. Heffer and Sons, Ltd.)

Chemical Warfare. By Brig.-General A. A. Fries and Major C. J. West. Pp. xi+445. (New York and London: McGraw-Hill Publishing Co., Inc.) 21*s.* net.

Transactions of the Royal Society of Edinburgh. Vol. 53, part 1 (No. 2). Shackleton Antarctic Expedition, 1914–17. Geological Observations in the Weddell Sea Area. By J. M. Wordie. Pp. 17–28+4 plates. (Edinburgh: R. Grant and Son; London: Williams and Norgate.) 4*s.*

Biologische Gesetze in ihren Beziehungen zur Allgemeinen Gesetzlichkeit der Natur. By Prof. Dr. J. Reinke. Pp. 31. (Leipzig: J. A. Barth.) 7.50 marks.

Life: How It Comes. A Child's Book of Elementary Biology. By S. Reid-Hayman. Pp. xiii+174. (Oxford: B. Blackwell.) 5*s.* net.

A History of Greek Mathematics. By Sir Thomas Heath. Vol. 1: From Thales to Euclid. Pp. xv+446. Vol. 2: From Aristarchus to Diophantus. Pp. xi+586. (Oxford: Clarendon Press.) 50*s.* net.

Report on the Economic and Natural Features of British Honduras in relation to Agriculture, with Proposals for Development. By W. R. Dunlop. Pp. iv+32. (London: Crown Agents for the Colonies.)

Einstein the Searcher: His Work explained from Dialogues with Einstein. By A. Moszkowski. Translated by H. L. Brose. Pp. xii+246. (London: Methuen and Co., Ltd.) 12*s.* 6*d.* net.

Cours Complet de Mathématiques Speciales. By Prof. J. Haag. Tome 2: Géométrie. Pp. viii+661. (Paris: Gauthier-Villars et Cie.) 65 francs.

Science Universelle de l'Energie. VI.: La Relativité et les Forces dans le Système Cellulaire des Mondes: Nouvelle Etude de Cosmogonie scientifique. By Capt. S. Christesco Pp. 302. (Paris: F. Alcan.) 12 francs net.

Les Maîtres de la Pensée scientifique: Collection de Mémoires et Ouvrages. Mémoires sur l'Electromagnétisme et l'Electrodynamique. By André-Marie Ampère. Pp. xiv+[illegible]. (Paris: Gauthier-Villars et Cie.) 3 francs net.

Les Maîtres de la Pensée scientifique: Collection de Mémoires et Ouvrages. Essai Philosophique sur les Probabilités. By Pierre-Simon Laplace. I. Pp. xii+103. II. Pp. iv+108. (Paris: Gauthier-Villars et Cie.) 3 francs net each.

Selection in Cladocera on the Basis of a Physiological Character. By A. M. Banta. (Publication No. 305, Paper No. 33, of the Department of Genetics.) Pp. ii+170. (Washington Carnegie Institution.) 2.50 dollars.

The Distribution of Vegetation in the United States as related to Climatic Conditions. By B. E. Livingston and E. Shreve. (Publication No. 284.) Pp. xvi+590+plates. (Washington: Carnegie Institution.) 9 dollars.

Observations made at the Royal Magnetical and Meteorological Observatory at Batavia. Vol. 39, 1916, containing Meteorological and Magnetical Observations made in 1916. By Dr. C. Braak. Pp. xxviii+118+3 charts. (Batavia.)

Recalculated Monthly Values of the Vertical Component and Inclination of the Magnetic Force at Buitenzorg, 1902–1910. (Appendix to "Observations made at the Royal Magnetical and Meteorological Observatory at Batavia," vol. 38, 1915.) Pp. iv+20. (Batavia.)

The Wheat Plant: A Monograph. By Prof. J. Percival. Pp. x+463. (London: Duckworth and Co.) 63*s.* net.

Virgil in Relation to the Place of Rome in the History of Civilisation. A Lecture given to Oxford University Extension Students. By Sir Herbert Warren. Pp. 36. (Oxford: B. Blackwell.) 2*s.* net.

Rural Organisation. By Prof. W. Burr. Pp. xiv+250. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd.) 12*s.* net.

Nut Growing. By R. T. Morris. Pp. x+236. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd.) 13*s.* net.

The Outline of Science: A Plain Story Simply Told. Edited by Prof. J. A. Thomson. Vol. 1, part 1. Pp. ii+40. (London: G. Newnes, Ltd.) 1*s.* 2*d.* net.

Morbid Fears and Compulsions: Their Psychology and Psychoanalytic Treatment. By Dr. H. W. Frink. Pp. xxiv+344. (London: Kegan Paul and Co., Ltd.) 21*s.* net.

Diary of Societies.

THURSDAY, NOVEMBER 24.

ROYAL SOCIETY, at 4.—Special General Meeting to consider the Annual Report of Council. At 4.30.—K. Sassa: (1) Observations on Reflex Responses to the Rhythmical Stimulation in the Frog. (2) The Effects of Constant Galvanic Currents upon the Mammalian Nerve-muscle and Reflex Preparations.—E. Ponder: The Hæmolytic Action of Sodium Glycholate.—Dorothy J. Lloyd and C. Mayes: The Titration Curve of Gelatine.—D. H. de Souza and J. A. Hewitt: Idio-Ventricular Periodicity.

CHILD-STUDY SOCIETY (at Royal Sanitary Institute), at 6.—Dr. C. Hay-Murray: Phrenology as an Aid to Education.

INSTITUTION OF LOCOMOTIVE ENGINEERS (London) (at Caxton Hall), at 7.15.—A. E. Kyffin: Axleboxes and Hornblocks.

CONCRETE INSTITUTE, at 7.30.—E. F. Etchells: Presidential Address.

OPTICAL SOCIETY (at Imperial College of Science and Technology), at 7.30.—Prof. F. J. Cheshire: Polarising Apparatus.

INTERNATIONAL COLLEGE OF CHROMATICS (at Caxton Hall), at 8.—Dr. A. C. D. Crommelin: Colour and the Stars.

CAMERA CLUB (at 17 John Street, W.C.2), at 8.15.—Miss Olive Eddis: A Colour Photography Trip in Canada.

ROYAL SOCIETY OF MEDICINE (Urology Section), at 8.30.—Discussion on Renal Function Tests.—*Short Opening Papers* by J. J. Everidge, J. S. Joly, J. B. Macalpine, Dr. MacLean and C. Nitch, Dr. M. Wallis and G. Ball. To be followed by Sir Cuthbert Wallace, Dr. L. Brown, F. Kidd, Dr. Marrack, G. E. Neligan, A. E. Webb-Johnson, and A. C. Morson.

SOCIETY OF ANTIQUARIES, at 8.30.

FRIDAY, NOVEMBER 25.

ROYAL SOCIETY OF ARTS (Dominion and Colonies and Indian Sections, Joint Meeting), at 4.30.—A. H. Ashbolt: An Imperial Airship Service.

PHYSICAL SOCIETY OF LONDON (at Imperial College of Science and Technology), at 5.—Discussion on Hygrometry.—Dr. E. Griffiths: Some Modified Forms of Hygrometers.—F. J. W. Whipple: The Theory of the Hair Hygrometer.—F. J. W. Whipple: The Rationale of Glaisher's System of Hygrometry.—Principal Skinner: The Wet and Dry Bulb Hygrometer.—W. Watts: Determination of the Proper Constant in Apjohn's Formula for Use in Aeroplanes.—H. G. Mayo and Prof. A M. Tyndall: A New Form of Absorption Hygrometer.—Prof. A. M. Tyndall and Prof. A. P. Chattock: A Thermal Hygrometer. To be followed by Sir Napier Shaw, Sir Richard Glazebrook, W. B. Hardy, Dr. G. C. Simpson, R. Corless, W. J. Hall, Dr. J. S. Anderson, Dr. G. Barr, W. H. Withey, and Dr. G. W. C. Kaye.

ROYAL SOCIETY OF MEDICINE (Study of Disease in Children Section), at 5.—Miss Eva Morton: Report on a Fatal Case of Bullous Eruption.

ELECTRICAL POWER ENGINEERS' ASSOCIATION (Southern Division) (at Central Hall, Westminster), at 7.—A. W. Bennis: Some Notes on Boiler House Plant.

INSTITUTION OF PRODUCTION ENGINEERS (at Institution of Mechanical Engineers), at 7.30.—A. F. Guyler: Drawings and Production.

JUNIOR INSTITUTION OF ENGINEERS, at 8.—G. F. Shotter: Electromagnetic Instruments: Problems in their Design and Construction.

© 1921 Nature Publishing Group